

WILEY

DIETZGEN
TRADE MARK

ENGINEERS'
LEVEL BOOK

No. 412 F

717

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide.

Side Slopes 1 on 1.

For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	0
1	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	1
2	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	2
3	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	3
4	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	4
5	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	5
6	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	6
7	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	7
8	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	8
9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	9
10	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	10
11	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	11
12	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	12
13	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	13
14	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	14
15	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	15
16	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	16
17	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	17
18	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	18
19	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	19
20	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	20
21	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	21
22	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	22
23	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	23
24	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	24
25	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	25
26	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	26
27	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	27
28	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	28
29	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	29
30	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	30
31	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	31
32	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	32
33	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	33
34	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	34
35	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	35
36	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	36
37	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	37
38	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	38
39	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	39
40	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	40

MICROFILMED

2
 48.29
 55.75

55.76

5.77

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 Room 268 Civic Center
 Telephone Main 5161

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 Grade 50% Rag Paper having a WATER
 RESISTING SURFACE, and is sewed with
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Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 30.6. For same slopes but other widths of roadbed, correct above figures by one-half difference in width of roadbed; thus in example above, for 20 ft. roadbed distance will be $30.6 + (20 - 16) \div 2$ or 2 ft. added to 0.6 = 32.6. For slopes of 1 on $1\frac{1}{2}$ see inside of back cover.

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7/25/47

Bliss Leonard

Left Right

Rib #	Spring Line offsets		Rib #	Bliss Leonard	
	Lt	Rt		Lt	Right
1	3.78	3.69	19	3.50	3.37
2	3.71	3.63	20	3.48	3.43
3	3.70	3.65	21	3.57	3.41
4	3.70	3.62	22	3.44	3.43
5	3.66	3.60	23	3.45	3.46
6	3.67	3.60	24	3.39	3.45
7	3.70	3.51	25	3.50	3.40
8	3.53	3.63	26	3.47	3.39
9	3.45	3.61	27	3.54	3.37
10	3.45	3.52	28	3.51	3.42
11	3.62	3.35	29	3.54	3.46
12	3.61	3.31	30	3.44	3.46
13	3.57	3.24	31	3.49	3.49
14	3.50	3.41	32	3.49	3.50
15	3.46	3.41	33	3.49	3.48
16	3.46	3.38	34	3.53	3.52
17	3.40	3.40	35	3.51	3.56
18	3.48	3.40	36	3.43	3.66

B.M.
Steel Pin
450+85++
4.88+
553.17

Crown

+ Elevations

2

Elev Grade
548.29
Crown Grade

#	Elevations	Elev	Crown Grade
#1	+2.65	555.82	555.75
#1A Spruce	+2.41	555.58	"
2	+2.56	555.73	"
3	+2.46	555.63	"
4	+2.52	555.69	"
5	+2.71	555.88	555.76
6	+2.75	555.92	"
7	+2.68	555.85	"
8	+2.42	555.59	"
9	+2.46	555.63	"
10	+2.43	555.60	"
11	+2.55	555.72	"
12	+2.59	555.76	"
13	+2.45	555.62	"
14	+2.23	555.40	555.77
15	+2.16	555.33	"
16	+2.20	555.37	"
17	+2.33	555.50	"
18	+2.30	555.47	"

	Lt	Rt
# 37	3.40	3.60
38	3.38	3.54
39	3.32	3.54
40	3.39	3.54
41	3.40	3.53
42	3.37	3.58
43	3.42	3.59
44	3.46	3.52
45	3.49	3.56
46	3.47	3.60
47	3.52	3.51
48	3.60	3.43
49	3.62	3.46
50	3.46	3.52
51	3.47	3.61
52	3.49	3.63
53	3.44	3.66
54	3.47	3.62

	+	X 553.17	-	Elev	3
#19			+2.33	555.50	555.77
#20			+2.26	555.43	"
#21			+2.22	555.39	"
22			+2.23	555.40	555.78
23			+2.15	555.32	"
24			+2.09	555.26	"
25			+2.07	555.24	"
26			+2.14	555.31	"
27			+2.15	555.32	"
28			+2.14	555.31	555.79
29			+2.22	555.39	"
30			+2.19	555.36	"
31			+2.29	555.46	"
32			+2.28	555.45	"
33			+2.33	555.50	"
34			+2.30	555.47	"
35			+2.33	555.50	"
36			+2.40	555.57	555.80

P.B #	Lt	Rt
55	3.53	3.62
56	3.58	3.54
57	3.61	3.52
58	3.66	3.47
59	3.57	3.50
60	3.51	3.54
61	3.50	3.56
62	3.40	3.51

See following page

T.	π 55317	-	Elev	4
#37		+2.51	555.68	555.80
38		+2.58	555.75	"
39		+2.66	555.83	"
40		+2.68	555.85	"
41		+2.64	555.81	"
42		+2.63	555.80	"
43		+2.68	555.85	"
44		+2.60	555.77	555.81
45		+2.68	555.85	"
46		+2.62	555.79	"
47		+2.55	555.72	"
48		+2.62	555.79	"
49		+2.67	555.84	"
50		+2.65	555.82	"
51		+2.71	555.88	"
52		+2.65	555.82	555.82
53		+2.64	555.81	"
54		+2.57	555.74	"

Spring Line

Lt

Rt

63	3.37	3.62
64	3.47	3.55
65	3.45	3.59
66	3.39	3.50
67	3.44	3.42
68	3.41	3.45
69	3.44	3.40
70	3.41	3.56
71	3.46	3.53
72	3.54	3.60
73	3.52	3.49

Continued from Page 5

 π
553.17

5

#55	+2.50	555.67	555.82
#56	+2.50	555.67	"
57	+2.55	555.72	"
58	+2.54	555.71	"
59	+2.66	555.83	"
60	+2.62	555.79	"
61	+2.62	555.83	555.83
62	+2.64	555.81	"
63	+2.54	555.71	"
64	+2.45	555.62	"
65	+2.39	555.56	"
66	+2.41	555.58	"
67	+2.41	555.58	"
68	+2.44	555.61	"
69	+2.50	555.67	555.84
70	+2.50	555.67	"
71	+2.52	555.69	"
72	+2.51	555.68	"
73	2.57	555.74	"

	Spring Line	Pt
#74	3.39	3.43
75	3.28	3.35
76	3.29	3.38
77	3.35	3.40
78	3.29	3.27
79	3.34	3.26
#80	3.72	3.51
81	3.68	3.58
82	3.66	3.61
83	3.70	3.63
84	3.65	3.71
85	3.70	3.65
86	3.72	3.65
87	3.72	3.62
88	3.70	3.63
89	3.71	3.68
90	3.67	3.69

	T		6
#74	553.17	+2.69	555.86 555.84
#75		+2.71	555.88 "
Callahan #76		+2.79	555.96 555.99
77		+2.71	555.88 555.84
Callahan #78		+2.80	555.97 555.99
Callahan #79		+2.93	556.10 555.99
Callahan on tt #80		+2.84	556.01 555.99
Callahan on tt #81		+2.98	556.15 556.00
Callahan " #82		+2.91	556.08 "
" " #83		+2.86	556.03 "
" " #84		+2.90	556.07 "
" " #85		+2.97	556.14 "
" " #86		+2.91	556.08 "
" " #87		+2.89	556.06 "
" " #88		+3.00	556.17 "
" " #89		+3.04	556.21 556.01
" " #90		+3.03	556.20 "
T.P.	-2.44 553.76	+3.03	556.20
check BM Mon 4/2		+3.39	549.37

	Lt	Spring line Rt
91	3.66	3.69
92	3.63	3.69
93	3.54	3.78
94	3.60	3.79
95	3.73	3.57
96	3.64	3.70
97	3.65	3.68
98	3.65	3.63
99	3.72	3.62
100	3.79	3.57
101	3.73	3.65
102	3.66	3.72
103	3.65	3.72
104	3.71	3.68

		7 553.76		7
^{Λ Gothic} #91	entit		+2.48	556.24 556.01
92	"		+2.47	556.23 "
93	"		+2.4	556.17 "
94	"		+2.39	556.15 "
95	"		+2.46	556.22 "
96	"		+2.47	556.23 "
97	"		+2.43	556.19 556.02
98	"		+2.38	556.14 "
99	"		+2.29	556.05 "
100	"		+2.33	556.09 556.10 "
T.P.	5.43	554.80	-4.39	549.37
101	"		+1.28	556.08 "
102	"		+1.25	556.05 "
103	"		+1.31	556.11 "
104	"		+1.29	556.09 "
T.P.			5.43	549.37

	Lt	Pt
426	3.71	3.61
27	3.76	3.58
28	3.73	3.58
29	3.67	3.69
430	3.62	3.74
31	3.67	3.71
32	3.56	3.78
33	3.66	3.71
34	3.64	3.70
35	3.51	3.84
36	3.61	3.76
37	3.53	3.73
38	3.59	3.78
39	3.64	3.72
440	3.61	3.71
41	3.54	3.80
42	3.60	3.74
43	3.54	3.82

	for-	for-	8
	493	554.37	549.44
426		+2.20	556.57 556.36
427		+2.27	56.64 "
428		+2.21	56.58 "
429		+2.21	56.58 "
430		+2.15	56.52 "
431		+2.20	56.57 "
432		+2.21	56.58 "
433		+2.23	56.60 556.37
434		+2.32	56.69 "
435		+2.25	56.62 "
436		+2.15	56.52 "
437		+2.08	56.45 "
438		+2.05	56.42 "
439		+2.03	56.40 "
440		+2.31	56.68 556.38
441		+2.27	56.64 "
442		+2.19	56.56 "
443		+2.23	56.60 "

	LT		RT	
444	3.53		3.81	578.19
45	3.50		3.83	578.25
46	3.60		3.74	58.11
47	3.66		3.74	58.11
48	3.74		3.67	58.04
49	3.78		3.58	57.95
450	3.77		3.60	57.77
51	3.70		3.69	58.06
52	3.75		3.61	57.97
53	3.72		3.67	58.09
54	3.72		3.64	58.01
55	3.76		3.62	57.77
56	3.73		3.64	57.71
57	3.68		3.70	58.07
58	3.64		3.75	58.12
59	3.71		3.67	58.01
460	3.76		3.65	58.02
61	3.68		3.69	58.06

			π		9
			55437		
444			+2.32	556.69	556.38
45			+2.28	56.65	"
46			+2.27	56.64	556.39
47			+2.27	56.64	"
48			+2.27	56.64	"
49			+2.30	56.67	"
450			+2.19	56.56	"
51			+2.21	56.58	"
52			+2.23	56.60	"
53			+2.23	56.60	556.40
54			+2.27	56.64	"
55			+2.28	56.65	"
56			+2.24	56.61	"
57			+2.22	56.59	"
58			+2.18	56.55	"
59			+2.16	56.53	556.41
460			+2.17	56.54	"
61			+2.25	56.62	"

	Lt	Rt
462	3.69	3.69
63	3.70	3.63
64	3.74	3.61
65	3.73	3.61
66	3.76	3.63
67	3.79	3.57
68	3.79	3.60
69	3.82	3.53
470	3.89	3.46
71	3.84	3.72
72	3.68	3.68
73	3.74	3.66
74	3.73	3.62
75	3.60	3.72
76	3.58	3.75
77	3.71	3.69
78	3.75	3.68
79	3.71	3.68

	55437	10.
462	12.15	556.62 556.41
63	+2.23	56.60 "
64	+2.23	56.60 "
65	+2.25	56.62 556.42
66	+2.22	56.59 "
67	+2.22	56.59 "
68	+2.22	56.59 "
69	+2.25	56.62 "
470	+2.19	56.56 "
71	+2.23	56.60 "
72	+2.21	56.58 556.43
73	+2.17	56.54 "
74	+2.20	56.57 "
75	+2.21	56.58 "
76	+2.22	56.59 "
77	+2.21	56.58 "
78	+2.25	56.62 556.44
79	+2.22	56.59 "

	Lt	Rt		
480	3.67	3.67		
81	3.75	3.62		
82	3.72	3.66		
83	3.71	3.65		
84	3.73	3.63		
85	3.78	3.57		
86	3.78	3.62		
87	3.73	3.66		
88	3.74	3.66		
89	3.76	3.60		
490	3.82	3.57		
91	3.73	3.56		
92	3.80	3.51		
93	3.67	3.66		
94	3.70	3.70		
95	3.67	3.71		
96	3.63	3.70		
97	3.65	3.69		

		55437		"
480		+2.24	556.61	556.44
81		+2.27	56.64	"
82		+2.19	56.56	"
83		+2.22	56.59	"
84		+2.30	56.67	556.45
85		+2.34	56.71	" 8
86		+2.29	56.66	"
87		+2.28	56.65	"
88		+2.27	56.64	"
89		+2.33	56.70	"
490		+2.31	56.68	556.46
91		+2.24	56.61	" 9
92		+2.18	56.55	"
93		+2.24	56.61	"
94		+2.21	56.58	"
95		+2.25	56.62	"
96		+2.36	56.67	556.47
97		+2.30	56.67	"

	Lt	Rt
498	3.65	3.70
99	3.59	3.77
500	3.63	3.75
01	3.74	3.63
02	3.76	3.64
03	3.73	3.60
04	3.73	3.65
05	3.72	3.62
06	3.79	3.58
07	3.74	3.64
08	3.72	3.63
09	3.78	3.58
510	3.74	3.60
11	3.60	3.75
12	3.57	3.79
13	3.70	3.63
14	3.69	3.65
15	3.65	3.67

	55437	12.
498		+2.31 556.68 556.47
99		+2.22 56.59 "
500		+2.20 56.57 "
501		+2.20 56.57 "
502		+2.25 56.62 "
503		+2.22 56.59 556.48
TP.	465 554.00	-4.33 549.44
504		+2.37 556.96 "
505		+2.33 56.42 "
506		+2.50 56.59 "
507		+2.50 56.59 "
508		+2.55 56.64 "
509		+2.60 56.69 556.49
10		+2.59 56.68 "
11		+2.54 56.63 "
12		+2.45 56.54 "
13		+2.47 56.56 "
14		+2.46 56.55 "
15		+2.43 56.52 556.50

	Lt	Rt
516	3.64	3.74
17	3.61	3.68
18	3.65	3.66
19	3.75	3.60
20	3.86	3.50
21	3.83	3.57
22	3.78	3.58
23	3.73	3.61
24	3.70	3.65
25	3.73	3.64
526	3.73	3.61
27	3.75	3.65
28	3.68	3.67
29	3.76	3.65
530	3.78	3.58
31	3.76	3.60
32	3.65	3.67
33	3.60	3.72

	X		13
516	554.09	+2.47	556.56 556.50
17		+2.50	56.59 "
18		+2.42	56.51 "
19		+2.42	56.51 "
20		+2.41	56.50 "
21		+2.42	56.57 556.51
22		+2.45	56.54 "
23		+2.56	56.65 "
24		+2.56	56.65 "
25		+2.57	56.66 "
26		+2.60	56.69 "
27		+2.56	56.65 556.52
28		+2.58	56.67 "
29		+2.57	56.67 "
530		+2.60	56.69 "
31		+2.60	56.69 "
32		+2.66	56.75 "
33		+2.64	56.73 "

	Lt	Rt
534	3.72	3.68
35	3.78	3.62
36	3.77	3.65
37	3.66	3.69
38	3.67	3.75
39	3.70	3.66
540	3.74	3.65
41	3.71	3.63
42	3.64	3.65
43	3.71	3.67
44	3.71	3.65
45	3.76	3.60
46	3.80	3.58
47	3.70	3.66
48	3.71	3.63
49	3.72	3.63
550	3.73	3.58

	π 554.09		14
534	+2.55	556.64	556.53
35	+2.57	56.66	"
36	+2.57	56.66	"
37	+2.52	56.61	"
38	+2.60	56.69	"
39	+2.63	56.72	"
540	+2.60	56.69	556.54
41	+2.65	56.74	"
42	+2.68	56.77	"
43	+2.57	56.66	"
44	+2.57	56.66	"
45	+2.60	56.69	"
46	+2.65	56.74	556.55
47	+2.70	56.79	"
48	+2.68	56.77	"
49	+2.69	56.78	"
550	+2.67	56.76	"
check 819	-4.84	549.25	Mon # 7 Record 549.27

	Lt	Spring Line Rt	3/4/47
1131	3.75	3.64	
32	3.71	3.64	
33	3.67	3.65	
34	3.72	3.64	
35	3.59	3.70	
36	3.64	3.72	
37	3.61	3.72	
38	3.55	3.78	
39	3.56	3.81	
1140	3.53	3.72	
41	3.58	3.76	
42	3.67	3.67	
43	3.67	3.71	
44	3.68	3.65	
45	3.56	3.78	
46	3.63	3.70	
47	3.61	3.74	
48	3.64	3.65	

	top Rib Elev	top	15
8m	-1.92	555.72	
1131	+1.90	557.64	TP on Rib 1130
32	+1.95	557.62	557.54
33	+1.95	57.67	557.54
34	+1.92	57.67	557.55
35	+1.90	57.64	"
36	+1.96	57.62	"
37	+1.96	57.68	"
38	+2.00	57.72	"
39	+1.97	57.69	"
1140	+2.00	57.72	557.56
41	+1.95	57.67	"
42	+2.00	57.72	"
43	+1.97	57.69	"
44	+1.98	57.70	"
45	+1.95	57.67	"
46	+1.98	57.70	"
47	+1.94	57.66	557.57
48	+1.98	57.70	"
49	+1.95	57.67	"

	Lt	Rt
1149	3.65	3.67
1150	3.67	3.67
51	3.67	3.67
52	3.67	3.66
53	3.69	3.68
54	3.80	3.63
55	3.79	3.55
56	3.68	3.64
57	3.67	3.67
58	3.67	3.68
59	3.65	3.72
1160	3.70	3.69
61	3.85	3.54
62	3.80	3.59
63	3.67	3.68
64	3.58	3.77
65	3.58	3.75
66	3.60	3.74

	T		16
1149	557.72	+1.90	557.62 557.57
50		+2.02	57.74 "
51		+2.02	57.74 "
52		+2.00	57.72 557.58
53		+2.01	57.73 "
54		+1.99	57.71 "
55		+2.02	57.74 "
56		+2.00	57.72 "
57		+2.02	57.74 "
58		+1.99	57.71 557.59
59		+2.02	57.74 "
1160		+2.02	57.74 "
61		+2.02	57.74 "
62		+2.00	57.72 "
63		+2.03	57.75 "
64		+2.03	57.75 557.60
65		+2.05	57.77 "
66		+2.06	57.78 "

	Lt	Spring Line	Rt
1167	3.64		3.69
68	3.68		3.67
69	3.62		3.71
1170	3.68		3.71
71	3.68		3.68
72	3.70		3.68
73	3.66		3.68
74	3.68		3.68
75	3.69		3.63
76	3.70		3.63
77	3.70		3.62
78	3.72		3.62
79	3.68		3.67
1180	3.70		3.65
81	3.67		3.66
82	3.64		3.70
83	3.60		3.75
84	3.67		3.62

		↑ 555.72		17
1167		+2.02	557.74	557.60
68		+2.01	57.73	"
69		+2.01	57.73	"
1170		+2.00	57.72	557.61
71		+2.00	57.72	"
72		+1.98	57.68	"
73		+1.99	57.71	"
74		+1.99	57.71	"
75		+1.99	57.71	"
76		+1.99	57.71	"
77		+2.03	57.75	557.62
78		+2.03	57.75	"
79		+1.98	57.70	"
1180		+2.02	57.74	"
81		+1.99	57.71	"
82		+2.04	57.76	"
83		+2.04	57.76	557.63
84		+2.14	57.86	"

	Lt	Rt
1185	3.70	3.67
86	3.71	3.68
87	3.72	3.67
88	3.62	3.72
89	3.65	3.72
1190	3.68	3.66
91	3.64	3.61
92	3.67	3.63
93	3.72	3.60
94	3.66	3.73
95	3.65	3.75
96	3.70	3.62
97	3.68	3.68
98	3.63	3.64
99	3.77	3.59
1200	3.60	3.68
01	3.65	3.76
02	3.65	3.67

	655.72	18
1185	+2.07	557.79 557.63
86	+2.05	57.77 "
87	+2.08	57.80 "
88	+2.06	57.78 "
89	+2.02	57.74 557.64
1190	+2.14	57.86 "
91	+2.13	57.85 "
92	+2.13	57.85 "
93	+2.01	57.73 "
94	+2.04	57.76 "
95	+1.98	57.70 "
96	+2.02	57.74 557.65
97	+2.05	57.77 "
98	+2.12	57.84 "
99	+2.08	57.80 "
1200	+2.05	57.77 "
01	+2.07	57.79 "
02	+2.06	57.78 557.66

	Lt	Rt
1203	3.71	3.65
04	3.72	3.64
05	3.68	3.66
06	3.70	3.60
07	3.77	3.61
08	3.80	3.57
09	3.88	3.52
1210	3.90	3.54
11	3.72	3.61
12	3.68	3.60
13	3.65	3.64
14	3.77	3.58
15	3.68	3.70
16	3.68	3.70
17	3.62	3.75
18	3.63	3.74
19	3.68	3.77
1220	3.73	3.73

	tor-	T 555.72	tor-	Elev	19
			+2.10	557.82	557.66
			+2.11	57.83	"
			+2.15	57.87	"
			+2.13	57.85	"
			+2.08	57.80	"
			+2.12	57.84	557.67
			+2.08	57.80	"
			+2.05	57.77	"
			+2.08	57.80	"
			+2.10	57.82	"
			+2.16	57.88	"
			+2.09	57.81	557.68
			+2.06	57.78	"
			+2.04	57.76	"
TP	-166	556.07	+2.01	557.75	"
			+1.64	557.73	"
				557.71	"
			+1.63	57.70	"
			+1.68	57.75	"
			+1.66	57.73	557.69

	L	R
1221	3.68	3.70
22	3.65	3.74
23	3.69	3.68
24	3.81	3.71
25	3.91	3.55
26	3.77	3.62
27	3.74	3.65
28	3.68	3.64
29	3.65	3.70
1230	3.72	3.65
31	3.78	3.67
32	3.70	3.60
33	3.75	3.65
34	3.69	3.65
35	3.72	3.67
36	3.70	3.68
37	3.65	3.62
38	3.56	3.80

~~556.69~~
 556.07 ✓

20

+1.65	557.72	557.69
+1.77	57.84	"
+1.80	57.87	"
+1.80	57.87	"
+1.75	57.82	"
+1.83	57.90	557.70
+1.82	57.89	"
+1.75	57.82	"
+1.75	57.82	"
+1.77	57.84	"
+1.73	57.80	"
+1.80	57.87	"
+1.79	57.86	557.71
+1.82	57.89	"
+1.79	57.86	"
+1.77	57.84	"
+1.80	57.87	"
+1.75	57.82	"

	Lt	Rt
1233	3.52	3.77
40	3.61	3.77
41	3.65	3.71
42	3.59	3.77
43	3.57	3.75
44	3.55	3.80
45	3.76	3.66
46	3.75	3.62
47	3.74	3.60
48	3.71	3.65
49	3.63	3.73
1250	3.61	3.71
51	3.64	3.69
52	3.66	3.72
53	3.72	3.64
54	3.74	3.64
55	3.73	3.73
56	3.72	3.72

End - 0

T
556.09
556.07 ✓

21

+1.82	557.89	557.72
+1.78	57.85	"
+1.74	57.81	"
+1.83	57.90	"
+1.85	57.92	"
+1.83	57.90	"
+1.84	57.91	557.73
+1.78	57.85	"
+1.78	57.85	"
+1.82	57.89	"
+1.84	57.91	"
+1.94	58.01	"
+1.99	58.06	557.74
+1.88	57.95	"
+1.83	57.90	"
+1.82	57.89	"
+1.84	57.91	"
+1.83	57.90	"

TP
BM
at Portal

6.84

558.79

-3.92

552.77

-2.15

556.62

556.68

556.68

Record
- 0.06 error

Bkso
King
Fahf

Rib Stationing Grossmont
Tunnel

#1	450 + 20 ⁶⁰
#14	+ 24
2	+ 26 ⁸
3	+ 30 ⁷
4	+ 34 ²
5	+ 38 ⁷
6	+ 43 ⁷
7	+ 47 ⁷
8	+ 51 ⁸
9	+ 55 ⁸
10	+ 59 ⁹
11	+ 63 ⁹
12	+ 67 ⁸
13	+ 71 ⁹
14	+ 75 ⁹
15	+ 79 ⁹
16	+ 83 ⁹
17	+ 88 ⁹ - CORR + 87 ⁹ RMD.
18	+ 91 ⁹

Sta

22

19	450 + 96
20	451 + 00
21	+ 04 ⁴
22	+ 08
23	+ 12 ⁴
24	+ 16 ⁴
25	+ 20 ³
26	+ 24 ²
27	+ 28 ³
28	+ 32 ³
29	+ 36 ³
30	+ 40 ³
31	+ 45 ³
32	+ 48 ³
33	+ 52 ⁵
34	+ 56 ⁴
35	+ 60 ⁴
36	+ 64 ⁵

57a

37 451 + 68⁴38 + 72⁴39 + 76⁵40 + 80⁵41 + 84⁵42 + 88⁵43 + 92⁶44 + 96⁵45 452 + 100⁵46 + 104⁵47 + 108⁵48 + 112⁵49 + 116⁶50 + 120⁶51 + 124⁶52 + 128⁶53 + 132⁶54 + 136⁷

57a

23

55 452 38⁷56 + 41⁷57 + 44⁸58 + 47⁸59 + 50⁹60 + 53⁹61 + 57⁹62 + 61⁸63 + 65⁹64 + 69⁹65 + 73⁹66 + 77⁹67 + 81⁹68 + 85⁹69 + 89⁹70 + 93⁹71 + 96⁹72 + 99⁹

	sta		sta
73	453+02 ²	91	453+74 ³
74	+07	92	+78 ³
75	+11	93	+82 ³
76	+15	94	+86 ⁴
77	+18	95	+90 ⁴
78	+22 ⁴	96	+94 ⁴
79	+25 ⁴	97	+98 ⁴
80	+30 ⁴	98	454+02 ⁴
81	+34 ⁴	99	+06 ⁴
82	+38 ⁴	100	+10 ⁴
83	+42 ⁴	101	+14 ⁵
84	+46 ⁴	102	+18 ⁵
85	+50 ⁵	103	+22 ⁵
86	+54 ⁵	104	+26 ⁵
87	+58 ⁵	105	+30 ⁵
88	+62 ⁵	106	+34 ⁵
89	+66 ⁵	107	+38 ⁵
90	+70 ⁵	108	+42 ⁵

	sta		sta ²⁴
109	454+46 ⁶	127	455+18 ⁹
110	+50 ⁷	128	+22 ⁹
111	+54 ⁷	129	+26 ⁹
112	+58 ⁸	130	+30 ⁹
113	+62 ⁸	131	+35
114	+66 ⁸	132	+39
115	+70 ⁸	133	+43
116	+74 ⁸	134	+47
117	+78 ⁸	135	+51
118	+82 ⁸	136	+55
119	+86 ⁸	137	+59
120	+90 ⁸	138	+63
121	+94 ⁸	139	+67
122	+98 ⁹	140	+71
123	455+02 ⁹	141	+75
124	+06 ⁹	142	+79
125	+10 ⁹	143	+83
126	+14 ⁹	144	+87 ⁴

Sta

145 455 + 92^L46 + 99^L47 456 + 02^L48 + 07^L49 + 12^L150 + 17^L51 + 22^L52 + 27^L53 + 32^L54 + 37^L55 + 42^L56 + 47^L57 + 52^L58 + 57^L59 + 62^L160 + 67^L61 + 72^L62 + 77^L

Sta

25

163 456 + 82^L64 + 87^L

65 + 92.5

66 + 97.5

67 457 + 02.5

68 + 07^L

69 + 12.8

170 + 17.8

71 + 22.8

72 + 27.8

73 + 32.8

74 + 37.8

75 + 42.8

76 + 47.8

77 + 52.8

78 + 57.8

79 + 62.8

180 + 66.8

	Sta		Sta
181	457 + 71.2	199	458 + 62.5
82	+ 77.0	200	+ 67.5
83	+ 82.0	01	+ 72.5
84	+ 87.1	02	+ 77.5
85	+ 92.1	03	+ 82.5
86	+ 97.1	04	+ 87.6
87	458 + 02.1	05	+ 92.6
88	+ 07.1	06	+ 97.7
89	+ 12.2	07	459 + 02.7
190	+ 17.2	08	+ 07.7
91	+ 22.3	09	+ 12.7
92	+ 27.3	210	+ 17.7
93	+ 32.3	11	+ 22.8
94	+ 37.3	12	+ 27.8
95	+ 42.3	13	+ 32.8
96	+ 47.3	14	+ 37.8
97	+ 52.4	15	+ 42.8
98	+ 57.4	16	+ 47.8

	Sta		Sta ²⁶
217	459 + 52.8	235	460 + 43.8
18	+ 57.8	36	+ 48.8
19	+ 62.8	37	+ 53.8
220	+ 67.9	38	+ 58.8
21	+ 72.9	39	+ 63.8
22	+ 78.3	240	+ 68.8
23	+ 83.4	41	+ 73.8
24	+ 88.5	42	+ 78.8
25	+ 93.5	43	+ 83.9
26	+ 98.4	44	+ 89.0
27	460 + 03.5	45	+ 94.0
28	+ 08.5	46	+ 99.0
29	+ 13.5	47	461 + 03.9
230	+ 18.6	48	+ 09
31	+ 23.6	49	+ 14
32	+ 28.6	250	+ 19
33	+ 33.7	51	+ 24.1
34	+ 38.7	52	+ 29.1

	Sta		Sta	
253	461	434	271	462 + 24 ^e
54		+ 39 ^z	72	+ 29 ^e
55		+ 44 ^z	73	+ 34 ^e
56		+ 49 ^z	74	+ 39 ^e
57		+ 54 ^z	75	44 ^e
58		+ 59 ^z	76	49 ^z
59		+ 64 ^z	77	54 ^z
260		+ 69 ^z	78	59 ^z
61		+ 74 ^z	79	64 ^z
62		+ 79 ^z	280	69 ^z
63		+ 84 ^z	81	74 ^z
64		+ 89 ^z	82	79 ^z
65		+ 94 ^z	83	84 ^z
66		+ 99 ^z	84	89 ^z
67	462	+ 04 ^z	85	94 ^z
68		+ 09 ^z	86	99 ^z
69		+ 14 ^z	87	463 04 ^z
270		+ 19 ^z	88	09 ^z

	Sta			Sta ²⁷
287	463	14 ^z	307	464 05 ^z
290		19 ^z	08	10 ^z
91		24 ^z	09	15 ^z
92		29 ^z	310	20 ^z
93		34 ^z	11	25 ^z
94		39 ^z	12	30 ^z
95		44 ^z	13	^N 35 ^z
96		49 ^z	14	^N 40 ^z
97		55 ^z	15	^N 45 ^z
98		60 ^z	16	^N 50 ^z
99		65 ^z	17	^N 55 ^z
300		70 ^z	18	^N 60 ^z
01		75 ^z	19	^N 65 ^z
02		80 ^z	320	^N 70 ^z
03		85 ^z	21	^N 75 ^z
04		90 ^z	22	80 ^z
05		95 ^z	23	85 ^z
06	464	00 ^z	24	90 ^z

	Sta		Sta	
325	464	96.6	343	465 74.2
26	465	0.6	44	78.3
27		5.6	45	82.3
28		10.7	46	86.3
29		15.7	47	90.3
330		20.7	48	94.4
31		25.8	49	98.4
32		29.8	350 466	02.3
33		33.9	51	06.3
34		37.9	52	10.3
35		41.9	53	14.3
36		45.9	54	18.3
37		50.0	55	22.4
38		54.0	56	26.4
39		58.1	57	30.5
340		62.1	58	34.5
41		66.1	59	38.6
42		70.2	360	42.6

	Sta		Sta ²⁸	
361		46.6	379	467 23.0
62		50.7	380	27.1
63		54.7	81	31.1
64		58.7	82	35.1
65		63.7	83	39.1
66		68.7	84	43.2
67		73.8	85	47.2
68		78.8	86	51.3
69		83.0	87	55.3
370		87.0	88	59.3
71		91.0	89	63.3
72		95.0	390	67.3
73		99.0	91	71.4
74	467	0.30	92	75.4
75		0.70	93	79.5
76		1.0	94	83.6
77		15.0	95	87.5
78		19.0	96	91.6

sta

397	95.6	415	468	68.0
38	99.6	16		72.0
39	468	03.7	17	76.0
400	07.7	18		80.0
01	11.7	19		84.0
02	15.7	20		88.0
03	19.8	21		93.1
04	23.8	22		98.1
05	27.8	23	469	03.1
06	31.8	24		08.1
07	35.8	25		13.2
08	39.8	26		17.2
09	43.8	27		21.2
10	47.9	28		25.3
11	51.9	29		29.3
12	55.9	30		33.3
13	60.0	31		37.3
14	64.0	32		41.4

29

433	469	45.4	451	34.8
34		50.5	52	39.8
35		55.4	53	44.9
36		60.5	54	50.0
37		65.5	55	55.0
38		70.6	56	60.0
39		75.6	57	65.1
40		80.6	58	70.2
41		85.7	59	75.2
42		90.7	60	80.2
43		95.7	61	85.2
44	470	0.70	62	90.3
45		5.7	63	95.3
46		9.7	64	471 00 ⁴
47		14.7	65	+ 05 ³
48		19.7	66	+ 10 ³
49		24.8	67	+ 15 ⁴
50		29.8	68	+ 20 ⁴

469	471	+25 ⁴	487	472+15 ²
70		+30 ⁴	88	+20 ²
71		+35 ⁴	89	+25 ²
72		+40 ⁵	90	+31.0
73		+45 ⁵	91	+36
74		+50 ⁵	92	+41 ²
75		+55 ⁵	93	+46 ²
76		+60 ⁶	94	+51 ²
77		+65 ⁷	95	+56 ²
78		+70 ⁷	96	+61 ²
79		+75 ⁷	97	+66 ²
480		+80 ⁷	98	+71 ²
81		+85 ⁷	99	+76 ²
82		+90 ⁷	500	+81 ²
83		+95 ⁸	01	+86 ²
84	472	+00 ⁸	02	+91 ²
85		+05 ⁸	03	+96 ²
86		+10 ⁸	04	473+01 ³

30

505	473	+06 ⁵	523	473	+96 ⁷
06		+11 ⁵	24	474	+01 ⁸
07		+16 ⁵	25		+06 ⁸
08		+21 ⁵	26		+11 ⁸
09		+26 ⁵	27		+16 ⁸
510		+31 ⁵	28		+21 ⁸
11		+36 ⁵	29		+26 ⁸
12		+41 ⁵	530		+31 ⁸
13		+46 ⁶	31		+36 ⁸
14		+51 ⁶	32		+41 ⁸
15		+56 ⁶	33		+46 ⁸
16		+61 ⁷	34		+51 ⁸
17		+66 ⁷	35		+56 ⁸
18		+71 ⁷	36		+61 ⁸
19		+76 ⁷	37		+66 ⁸
520		+81 ⁷	38		+71 ⁸
21		+86 ⁷	39		+76 ⁸
22		+91 ⁷	540		+82

541	+87	559	+77 ³
42	+92	560	+82 ³
43	+97	61	+87 ³
44	475 +02	62	+92 ³
45	+07	63	+97 ³
46	+12	64	476 +02 ³
47	+17	65	+07 ³
48	+22 ¹	66	+12 ⁴
49	+27 ¹	67	+17 ⁴
550	+32 ¹	68	+22 ⁴
51	+37 ¹	69	+27 ⁴
52	+42 ¹	570	+32 ⁴
53	+47 ¹	71	+37 ⁴
54	+52 ¹	72	+42 ⁴
55	+57 ²	73	+47 ⁵
56	+62 ³	74	+52 ⁵
57	+67 ³	75	+57 ⁵
58	+72 ³	76	+62 ⁵

577	+67 ⁵	595	+58
78	+72 ⁶	96	+63 ¹
79	+77 ⁶	97	+68 ¹
580	+82 ⁷	98	+73 ¹
81	+87 ⁷	99	+78 ²
82	+92 ⁷	600	+83 ²
83	+97 ⁷	01	+88 ²
84	477 +02 ⁸	02	+93 ³
85	+07 ⁸	03	+98 ³
86	+12 ⁸	04	478 +03 ³
87	+17 ⁸	05	+08 ³
88	+22 ⁸	06	+13 ³
89	+27 ⁹	07	+18 ³
590	+32 ⁹	08	+23 ⁴
91	+37 ⁹	09	+28 ⁴
92	+43 ⁹	610	+33 ⁴
93	+48 ⁹	11	+38 ⁴
94	+53	12	+43 ⁴

613		485		
114	478	+53 ⁴	632	+43.8
15		+58 ⁵	33	+48.8
16		+63 ⁶	34	+53.8
17		+68 ⁶	35	+58.8
18		+73 ⁶	36	+63.8
19		+78 ⁶	37	+68.2
620		+83 ⁶	38	+73 ⁹
621		+88 ⁶	39	+78 ⁹
22		+93 ⁶	640	+83 ⁹
23		+98 ⁷	41	+88 ⁹
24	479	+03 ⁷	42	+94
25		+08 ⁷	43	+99
26		+13 ⁷	44	480 04
27		+18 ⁷	45	09
28		+23 ⁷	46	14.1
29		+28 ⁷	47	+19.1
630		+33 ⁸	48	+24.1
631		+38 ⁸	49	+29.1

32

650	480	+34 ¹	668	481	+24 ³
51		+39 ¹	69		+29 ³
52		+44 ²	670		+34 ⁴
53		+49 ²	71		+39 ⁴
54		+54 ²	72		+44 ⁴
55		+59 ²	73		+49 ⁴
56		+64 ²	74		+54 ⁴
57		+69 ²	75		+59 ⁵
58		+74 ²	76		+64 ⁵
59		+79 ²	77		+69 ⁵
660		+84 ²	78		+74 ⁵
61		+89 ²	79		+79 ⁶
62		+94 ³	680		+84 ⁶
63		+99 ³	81		+89 ⁶
64	481	+04 ³	82		+94 ⁶
65		+09 ³	83		+99 ⁶
66		+14 ³	84	482	+04 ⁶
67		+19 ³	85		+09 ⁷

686	482	714 ²	704	483	05 ¹
87		+19 ²	05		+10 ¹
88		+24 ⁸	06		+15 ¹
89		+29 ⁸	07		+20 ¹
690		+34 ⁸	08		+25 ¹
91		+39 ⁸	09		+30 ²
92		+44 ⁹	710		+35 ²
93		+49 ⁹	11		+40 ²
94		+54 ⁹	12		+45 ²
95		+59 ⁹	13		+50 ²
96		+64 ⁹	14		+55 ³
97		+70	15		+60 ³
98		+74 ⁹	16		+65 ³
99		+80	17		+70 ³
700		+85	18		+75 ³
01		+90	19		+80 ⁴
02		+95	720		+85 ⁵
03	483	+00	21		+90 ⁵

33

722	483	+95 ⁵	740		+86 ¹
23	484	00 ⁵	41		+91 ²
24		+05 ⁵	42		+96 ³
25		+10 ⁶	43	485	+01 ³
26		+15 ⁷	44		+06 ³
27		+20 ⁷	45		+11 ³
28		+25 ⁸	46		+16 ³
29		+30 ⁸	47		+21 ⁴
730		+35 ⁸	48		+26 ⁴
31		+40 ⁹	49		+31 ⁴
32		+45 ⁹	750		+36 ⁴
33		+50 ⁹	51		+41 ⁵
34		+55 ⁹	52		+46 ⁵
35		+61	53		+51 ⁵
36		+66	54		+56 ⁵
37		+71	55		+61 ⁶
38		+76	56		+66 ⁶
39		+81 ¹	57		+71 ⁷

758	+76 ²	776	+67
59	+81 ²	77	+72
760	+86 ²	78	+77
61	+91 ²	79	+82 ¹
62	+96 ²	780	+87 ¹
63	486 +01 ²	81	+92 ²
64	+06 ²	82	+97 ²
65	+11 ²	83	487 +02 ²
66	+16 ⁸	84	+07 ²
67	+21 ⁸	85	+12 ³
68	+26 ⁸	86	+17 ³
69	+31 ⁸	87	+22 ³
770	+36 ⁹	88	+27 ³
71	+41 ⁹	89	+32 ³
72	+46 ⁹	790	+37 ³
73	+51 ⁹	91	+42 ³
74	+57	92	+47 ³
75	+62	93	+52 ³

794	+57 ³	812	488 +47 ⁵
95	+62 ⁴	13	+52 ⁵
96	+67 ³	14	+57 ⁵
97	+72 ³	15	+62 ⁵
98	+77 ³	16	+67 ⁵
99	+81 ⁴	17	+72 ⁵
800	+87 ⁴	18	+77 ⁵
01	+92 ⁴	19	+82 ⁵
02	487 +97 ⁴	820	+87 ⁵
03	488 +02 ⁴	21	+92 ⁵
04	+07 ⁴	22	+97 ⁶
05	+12 ⁴	23	489 +02 ⁵
06	+17 ⁴	24	+07 ⁵
07	+22 ⁵	25	+12 ⁵
08	+27 ⁵	26	+17 ⁵
09	+32 ⁵	27	+22 ⁶
810	+37 ⁵	28	+27 ⁷
11	+42 ⁵	29	+32 ⁷

830	489	+37. ⁷	848	+28. ²
31		+42. ⁷	49	+33. ²
32		+47. ⁸	50	+38. ²
33		+52. ⁸	51	+43. ²
34		+57. ⁸	52	+48. ²
35		+62. ⁸	53	+54. ²
36		+67. ⁹	54	+60. ³
37		+73. ⁹	55	+66. ³
38		+77. ⁹	56	+72. ³
39		+82. ⁹	57	+78. ³
40		+87. ⁹	58	+84. ³
41		+93. ⁰	59	+90. ³
42		+98	860	+96. ³
43	490	+03	61	491 +02. ³
44		+08	62	+08. ³
45		+13	63	+14. ⁴
46		+18. ^L	64	+20. ⁴
47		+23. ^L	65	+26. ⁴

35

866		+32. ⁴	884	+40. ²
67		+38. ⁴	85	+46. ²
68		+44. ⁴	86	+53
69		+50. ⁴	87	+59
70		+56. ⁶	88	+65
71		+62. ⁶	89	+71
72		+68. ⁶	890	+77. ^L
73		+74. ⁶	91	+83. ^L
74		+80. ⁶	92	+89. ^L
75		+86. ⁶	93	+95. ^L
76		+92. ⁷	94	493 +01. ^L
77		+98. ⁷	95	+07. ^L
78	492	+04. ⁷	96	+13. ³
79		+10. ⁸	97	+19. ⁴
880		+16. ⁸	98	+25. ⁴
81		+22. ⁸	99	+31. ⁴
82		+28. ⁸	900	+37. ⁴
83		+34. ⁸	01	+43. ⁵

962	493	+49 ^e	220	+58
03		+55 ^s	21	+64
04		+61 ^e	22	+70
05		+67 ^e	23	+76
06		+73 ^e	24	+82
07		+79 ⁷	25	+88
08		+85 ²	26	+94 ^L
09		+91 ⁷	27	+95 +00 ^L
910		+97 ⁷	28	+96 ^L
11	494	+93 ⁸	29	+12 ²
12		+99 ⁸	30	+18 ²
13		+15 ⁸	31	+24 ²
14		+21 ⁸	32	+30 ³
15		+27 ⁹	33	+36 ³
16		+33 ⁹	34	+42 ³
17		+39 ⁹	35	+48 ³
18		+45 ⁹	36	+54 ⁴
19		+51 ⁹	37	+60 ⁴

36

938		+66 ⁴	956	496	+75
39		+72 ^e	57		+81
40		+78 ^e	58		+87
41		+84 ^e	59		+93 ²
42		+90 ^e	960		+99 ²
43		+96 ^e	61	497	+105 ²
44	496	+102 ⁷	62		+11 ²
45		+108 ⁷	63		+17 ³
46		+114 ⁸	64		+22 ³
47		+120 ⁷	65		+29 ³
48		+126 ⁸	66		+35 ⁴
49		+132 ⁸	67		+41 ⁴
950		+138 ⁹	68		+47 ⁴
51		+144 ⁹	69		+53 ⁴
52		+150 ⁹	70		+59 ⁵
53		+156 ⁹	71		+65 ⁵
54		+162 ⁹	72		+71 ⁵
55		+168 ⁹	73		+77 ⁵

974	497	+83 ⁶	992	498	+92 ¹
75		+89 ⁶	93		+98 ¹
76		+25 ⁶	94	499	+04 ²
77	498	+01 ⁷	95		+10 ²
78		+07 ⁷	96		+16 ³
79		+13 ⁸	97		+22 ³
980		+19 ⁸	98		+28 ³
81		+25 ⁸	99		+34 ³
82		+31 ⁹	1000		+40 ³
83		+37 ⁹	01		+46 ⁴
84		+43 ⁹	02		+52 ⁴
85		+49 ⁹	03		+58 ⁴
86		+56	04		+64 ⁴
87		+62	05		+70 ⁵
88		+68	06		+76 ⁵
89		+74	07		+82 ⁵
990		+80 ¹	08		+88 ⁶
91		+86 ¹	09		+95 ⁶

37

1010	506	+02 ⁶	1028	501	+68 ⁴
11		+09 ⁷	29		+13 ⁵
12		+16 ⁷	30		+19 ⁵
13		+22 ⁸	31		+23 ⁵
14		+28 ⁸	32		+28 ⁵
15		+34 ⁹	33		+33 ⁶
16		+40 ⁹	34		+38 ⁶
17		+46 ⁹	35		+43 ⁶
18		+53	36		+48 ⁶
19		+59	37		+53 ⁶
1020		+65 ¹	38		+58 ⁶
21		+71 ¹	39		+63 ⁷
22		+77 ²	40		+68 ⁷
23		+83 ³	41		+73 ⁸
24		+88 ³	42		+78 ⁸
25		+93 ³	43		+83 ⁸
26		+98 ⁴	44		+88 ⁸
27	501	+03 ⁴	45		+93 ⁹

1046	138 ³		
47	502 +04		
48	+09 ¹		
49	+14 ¹		
1050	+19 ¹		
51	+24 ²		
52	+29 ²		
53	+34 ²		
54	+39 ²		
55	+44 ²		
56	+49 ³		
57	+54 ⁴		
58	+59 ⁴		
59	+64 ⁴		
1060	+69 ⁴		
61	+74 ⁵		
62	+79 ⁵		
63	+84 ⁵		

38

1064	502 +89 ⁵	1082	+79 ³
65	+94 ⁵	83	+84 ³
66	+99 ⁶	84	+89 ³
67	503 +04 ⁶	85	+94 ³
68	+09 ⁵	86	504 +00
69	+14 ⁶	87	+05
1070	+19 ⁶	88	+10
71	+24 ⁶	89	+15
72	+29 ⁷	1070	+20
73	+34 ⁸	91	+25 ¹
74	+39 ⁸	92	+30 ¹
75	+44 ⁸	93	+35 ¹
76	+49 ⁸	94	+40 ¹
77	+54 ⁹	95	+45 ¹
78	+59 ⁹	96	+50 ¹
79	+64 ⁹	97	+55 ¹
1080	+69 ⁹	98	+60 ²
81	+74 ⁹	99	+65 ²

1100	+70 ²	1118	+60 ⁶
01	+75 ²	19	+65 ⁶
02	+80 ²	20	+70 ⁶
03	+85 ²	21	+75 ⁷
04	+90 ³	22	+80 ⁷
05	+95 ³	23	+85 ⁷
06	505 +100 ⁴	24	+90 ⁷
07	+105 ⁴	25	+95 ⁸
08	+110 ⁵	26	506 +100 ⁸
09	+115 ⁵	27	+105 ⁸
110	+120 ⁵	28	+110 ⁸
111	+125 ⁵	29	+115 ⁸
12	+130 ⁵	1130	+120 ⁸
13	+135 ⁵	31	+125 ⁸
14	+140 ⁶	32	+130 ⁸
15	+145 ⁶	33	+136
16	+150 ⁶	34	+141
17	+155 ⁶	35	+146

39

1136	506	+51	1154	507	+41 ⁴
37		+56	55		+46 ⁵
38		+61 ¹	56		+51 ⁵
39		+66 ¹	57		+56 ⁵
40		+71 ¹	58		+61 ⁵
41		+76 ¹	59		+66 ⁵
42		+81 ¹	1160		+71 ⁵
43		+86 ²	61		+76 ⁵
44		+91 ²	62		+81 ⁵
45		+96 ³	63		+86 ⁵
46	507	+101 ²	64		+91 ⁵
47		+106 ²	65		+96 ⁶
48		+111 ³	66	508	+101 ⁶
49		+115 ³	67		+106 ⁶
1150		+121 ⁴	68		+111 ⁶
51		+126 ⁴	69		+116 ⁶
52		+131 ⁴	1170		+121 ⁷
53		+136 ⁴	71		+126 ⁷

1172	508	+31 ²	1190	509	+22 ²
73		+36 ⁸	91		+27 ²
74		+41 ⁸	92		+32 ³
75		+46 ⁸	93		+37 ³
76		+51 ⁸	94		+42 ³
77		+56 ⁸	95		+47 ³
78		+61 ⁹	96		+52 ³
79		+66 ⁹	97		+57 ³
1180		+71 ⁹	98		+62 ⁴
81		+77	99		+67 ⁴
82		+82	1200		+72 ⁴
83		+87	01		+77 ⁵
84		+92 ^L	02		+82 ⁵
85		+97 ^L	03		+87 ⁶
86	509	+02 ^L	04		+92 ⁶
87		+07 ²	05		+97 ⁷
88		+12 ²	06	510	+02 ⁸
89		+17 ²	07		+07 ⁸

1208	510	+12 ⁸	1226	511	+03 ³
09		+17 ⁸	27		+08 ³
10		+22 ⁸	28		+13 ³
11		+27 ⁸	29		+18 ³
12		+32 ⁹	30		+23 ⁴
13		+38	31		+28 ⁴
14		+43	32		+33 ⁵
15		+48	33		+38 ⁵
16		+53	34		+43 ⁶
17		+58 ^L	35		+48 ⁶
18		+63 ^L	36		+53 ⁶
19		+68 ^L	37		+58 ⁶
1220		+73 ²	38		+63 ⁷
21		+78 ²	39		+68 ⁷
22		+83 ²	1240		+73 ⁷
23		+88 ³	41		+78 ⁷
24		+93 ³	42		+83 ⁸
25		+98 ³	43		+88 ⁸

1244 +98⁸

45 +98⁸

46 512 +03⁹

47 +08⁹

48 +14

49 +19

50 +24

51 +29^L

52 +34^L

53 +39^L

54 +44^L

55 +49^L

56 +54^L

End 0

7542
52541

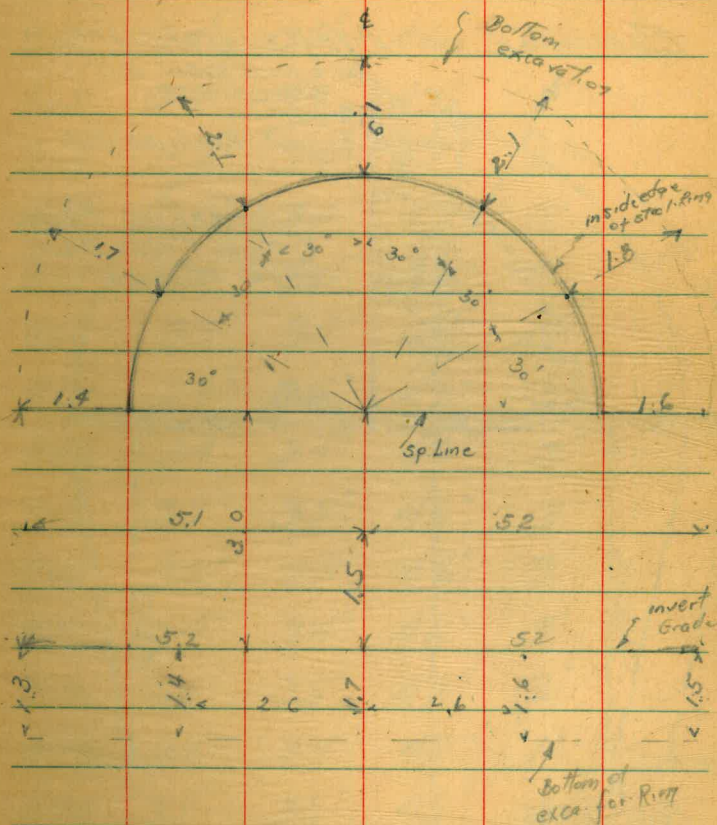
Bliss
Leonard
Feb 2/3/47 X. Section Cross Mont Tunnel
from 512+14 to 512+30
Pib H

	Lt	¢	Rt
512+30 1250	$\frac{-3.8}{3.0}$	$\frac{-4.1}{3.0}$	$\frac{-3.7}{2.8}$
512+24 1250	$\frac{-3.6}{3.0}$	-3.8	$\frac{-3.7}{2.8}$
512+19 1249	$\frac{-3.6}{3.0}$	-3.9	$\frac{-3.7}{2.8}$
512+14 1248	$\frac{-3.9}{2.7}$	-4.0	$\frac{-3.8}{2.7}$

X. Sec of Ground for Cut of Ring

at 512+16.5

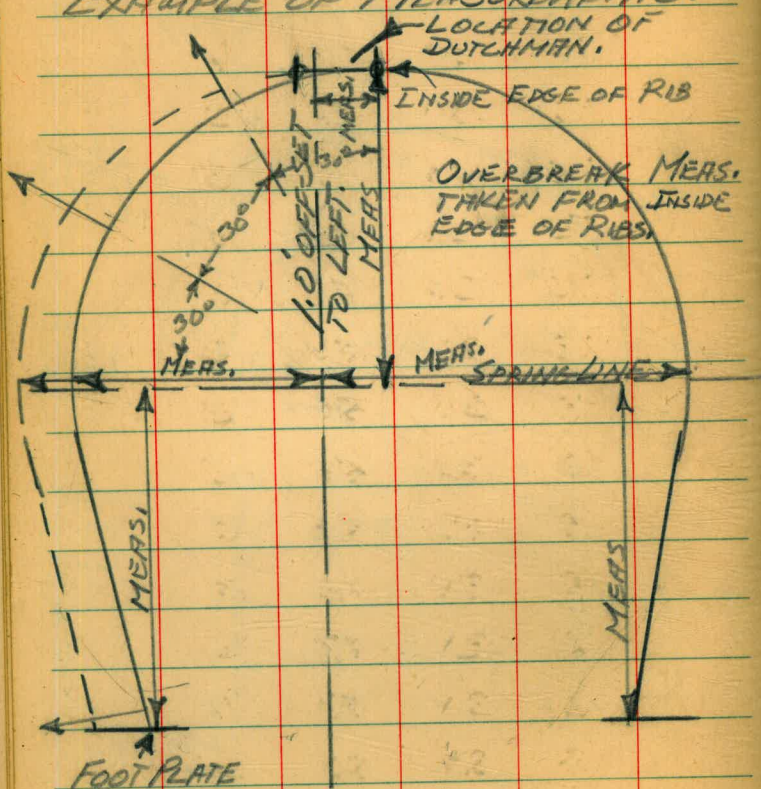
Average width of excavation 1.5



CROSS-SECTION OF RR SWITCH
 TAKEN BY - INSPECTOR RW DARBY

CROSS-SECTION

EXAMPLE OF MEASUREMENTS.



AREA - DOWNSTREAM SWITCH.

MEAS. FROM SPRING LINE TO:

RIB #	LEFT FOOT PLATE	RIGHT FOOT PLATE	CROWN AT 4	DUTCHMAN
861	36"	36"	46"	0'
862	37"	34"	47"	1'
863	37"	34"	47"	2'
864	36"	34"	47"	3'
865	35"	35"	47"	3'
866	35"	35"	47"	3'
867	33"	35"	47"	3'
868	34"	34"	46"	3'
869	35"	35"	46"	3'
870	35"	35"	46"	3'
871	34"	34"	46"	3'
872	36"	35"	47"	2'
873	36"	34"	47"	1'
874	35"	35"	45"	0'

CROSS-SECTION OF RR SWITCH

MEAS. FROM 1' OFF-SET TO:

RIB #	LEFT SPRINGLINE	RIGHT SPRINGLINE	NORMAL RIB &	DUTCHMAN
861	32"	55"	13"	0'
862	44"	55"	12"	1'
863	56"	56"	12"	2'
864	68"	56"	12"	3'
865	70"	56"	12"	3'
866	68"	56"	12"	3'
867	69"	56"	13"	3'
868	69"	56"	12"	3'
869	66"	58"	14"	3'
870	67"	57"	14"	3'
871	67"	56"	13"	3'
872	56"	56"	13"	2'
873	44"	56"	12"	1'
874	32"	56"	12"	0'

Lower corner fill is standard but shifted over the width of dutchman.

AREA - CONTINUED.

OVER-BREAK MEAS.

RIB #	LEFT FOOT PLATE	SPRING LINE	30° UP	30° DOWN	DUTCHMAN PLATE	NORMAL &	30° DOWN	30° UP	SPRING LINE	RIGHT FOOT PLATE	DUTCHMAN
861	9"	9"	10"	13"	-	11"	15"	11"	9"	11"	0'
62	8"	7"	7"	9"	28"	25"	17"	10"	13"	10"	1'
63	8"	7"	9"	11"	12"	9"	8"	9"	8"	8"	2'
64	9"	8"	8"	8"	7"	10"	8"	9"	8"	8"	3'
65	10"	7"	9"	9"	7"	13"	9"	11"	11"	12"	3'
66	7"	6"	6"	9"	8"	19"	11"	9"	8"	10"	3'
67	6"	7"	7"	7"	10"	12"	12"	10"	10"	10"	3'
68	6"	7"	6"	7"	9"	14"	10"	10"	11"	11"	3'
69	8"	7"	8"	10"	9"	14"	12"	14"	8"	10"	3'
70	10"	8"	8"	11"	10"	18"	13"	10"	9"	13"	3'
71	8"	7"	7"	6"	9"	18"	16"	9"	10"	11"	3'
72	10"	9"	6"	9"	10"	13"	14"	8"	9"	10"	2'
73	6"	6"	6"	9"	11"	11"	11"	10"	8"	8"	1'
874	8"	10"	9"	13"	-	11"	13"	11"	11"	10"	0'

CROSS-SECTION OF RR SWITCH

TAKEN BY INSPECTOR RW DARBY

MEAS. FROM 1st OFFSET TO:

RIB #	LEFT SPRING LINE	RIGHT SPRING LINE	NORMAL RIB &	DUTCHMAN
312	33	56	12	0
13	45	56	12	1
14	58	56	12	2
15	69 1/2	56	12	3
16	71 1/2	57	11	3
17	73	55	10	3
18	70 1/2	56	10 1/2	3
19	69 1/2	55 1/2	11 1/2	3
20	69	56	12	3
21	69	56	13	3
22	69	56	11	3
23	60 1/2	56	11	2
24	44	56	11	1
325	33	56	12	0

Lower corner fill on widened side has toe directly below spring line of reinforcing steel.

AREA - UPSTREAM SWITCH

- SEE DETAIL PAGE 43.

MEAS. FROM SPRING LINE TO:

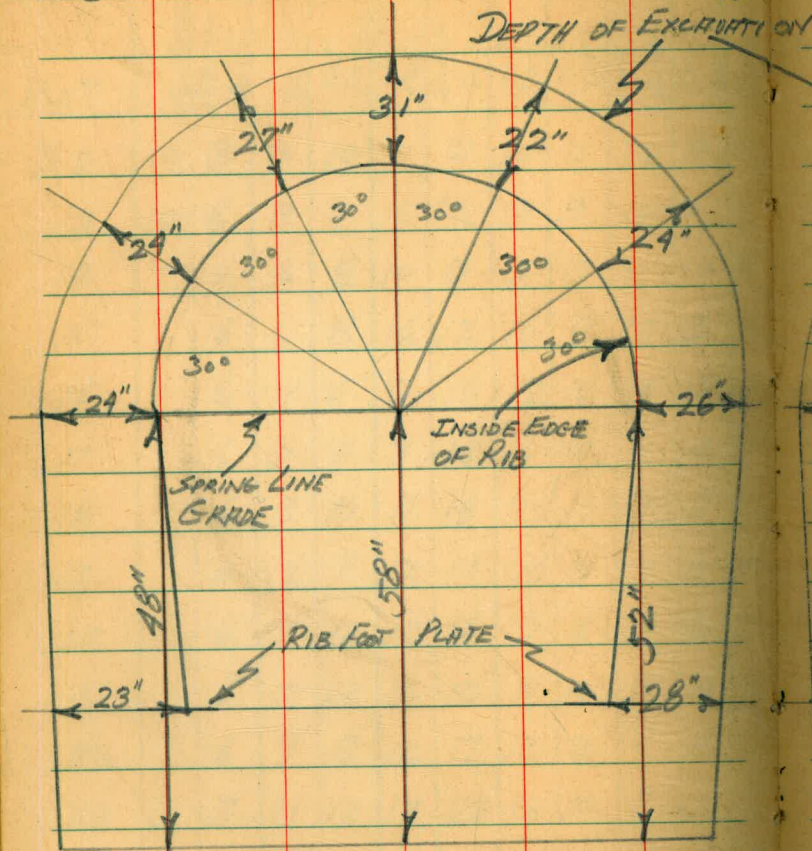
RIB #	CROWN HT &	DUTCHMAN
312	46 1/2	0
313	47	1
14	46	2
15	45	3
16	46	3
17	46	3
18	44	3
19	45	3
20	44	3
21	43	3
22	45	3
23	44	2
24	45	1
325	45	0

CROSS-SECTION OF RR SWITCH

AREA - (CONTINUED)

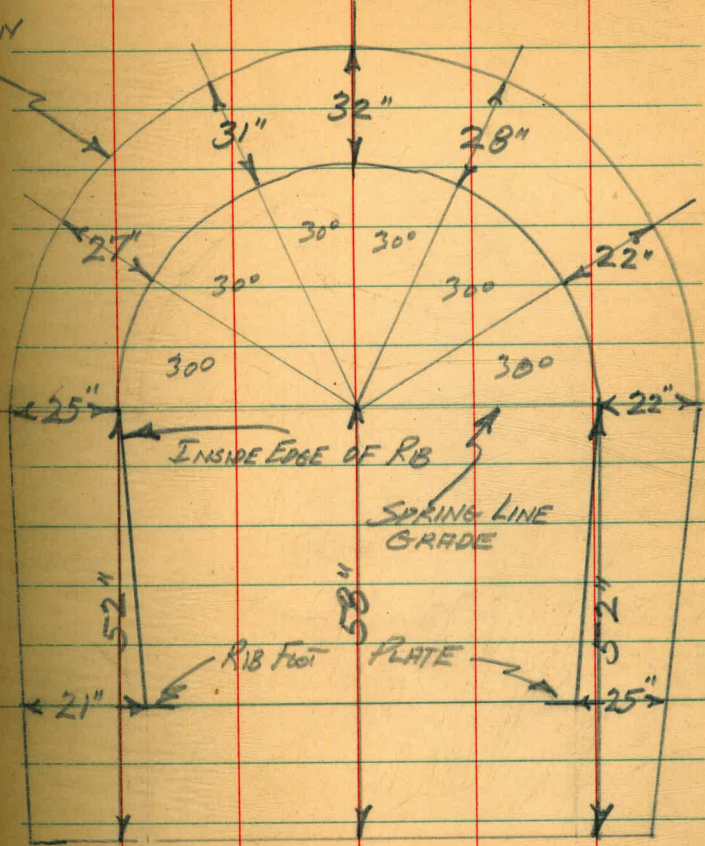
RIB #	OVERBREAK MEAS.											
	LEFT FOOT PLATE	SPRING LINE	30° UP	30° DOWN	DOWNGRADE PLATE	NORMAL	30° DOWN	30° UP	SPRING LINE	RIGHT FOOT PLATE	DOWNGRADE	
3/2	10	8	9	10	-	9	10	11	12	9	0	
13	10	8	8	9	12	12	9	9	10	9	1	
14	-	6	6	8	10	9	9	9	11	10	2	
15	-	6	6	8	16	12	10	8	7	9	3	
16	-	6	11	6	9	16	12	10	14	15	3	
17	-	6	9	11	7	18	16	14	10	12	3	
18	-	6	8	10	11	18	22	10	7	8	3	
19	-	6	12	7	12	14	20	9	7	8	3	
20	-	6	7	12	12	14	9	8	7	8	3	
21	-	7	9	12	12	10	9	11	9	8	3	
22	-	6	7	8	12	17	13	9	7	8	3	
23	-	7	11	12	17	22	18	10	6	10	2	
24	-	8	9	12	10	13	9	10	9	10	1	
325	12	10	17	18	-	12	8	9	10	9	0	

CROSS-SECTION OF AREA OF
CUT-OFF COLLAR AT STA 450+49.8 (4)



AVERAGE WIDTH = 13"

CROSS-SECTION OF AREA OF
CUT-OFF COLLAR AT STA 451+82.5 (4)



Average Width = 12"

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide.

Side Slopes 1 on 1½

For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2	9.4	0
1	9.5	9.7	9.8	10.0	10.1	10.3	10.4	10.6	10.7	10.9	1
2	11.0	11.2	11.3	11.5	11.6	11.8	11.9	12.1	12.2	12.4	2
3	12.5	12.7	12.8	13.0	13.1	13.3	13.4	13.6	13.7	13.9	3
4	14.0	14.2	14.3	14.5	14.6	14.8	14.9	15.1	15.2	15.4	4
5	15.5	15.7	15.8	16.0	16.1	16.3	16.4	16.6	16.7	16.9	5
6	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4	6
7	18.5	18.7	18.8	19.0	19.1	19.3	19.4	19.6	19.7	19.9	7
8	20.0	20.2	20.3	20.5	20.6	20.8	20.9	21.1	21.2	21.4	8
9	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	9
10	23.0	23.2	23.3	23.5	23.6	23.8	23.9	24.1	24.2	24.4	10
11	24.5	24.7	24.8	25.0	25.1	25.3	25.4	25.6	25.7	25.9	11
12	26.0	26.2	26.3	26.5	26.6	26.8	26.9	27.1	27.2	27.4	12
13	27.5	27.7	27.8	28.0	28.1	28.3	28.4	28.6	28.7	28.9	13
14	29.0	29.2	29.3	29.5	29.6	29.8	29.9	30.1	30.2	30.4	14
15	30.5	30.7	30.8	31.0	31.1	31.3	31.4	31.6	31.7	31.9	15
16	32.0	32.2	32.3	32.5	32.6	32.8	32.9	33.1	33.2	33.4	16
17	33.5	33.7	33.8	34.0	34.1	34.3	34.4	34.6	34.7	34.9	17
18	35.0	35.2	35.3	35.5	35.6	35.8	35.9	36.1	36.2	36.4	18
19	36.5	36.7	36.8	37.0	37.1	37.3	37.4	37.6	37.7	37.9	19
20	38.0	38.2	38.3	38.5	38.6	38.8	38.9	39.1	39.2	39.4	20
21	39.5	39.7	39.8	40.0	40.1	40.3	40.4	40.6	40.7	40.9	21
22	41.0	41.2	41.3	41.5	41.6	41.8	41.9	42.1	42.2	42.4	22
23	42.5	42.7	42.8	43.0	43.1	43.3	43.4	43.6	43.7	43.9	23
24	44.0	44.2	44.3	44.5	44.6	44.8	44.9	45.1	45.2	45.4	24
25	45.5	45.7	45.8	46.0	46.1	46.3	46.4	46.6	46.7	46.9	25
26	47.0	47.2	47.3	47.5	47.6	47.8	47.9	48.1	48.2	48.4	26
27	48.5	48.7	48.8	49.0	49.1	49.3	49.4	49.6	49.7	49.9	27
28	50.0	50.2	50.3	50.5	50.6	50.8	50.9	51.1	51.2	51.4	28
29	51.5	51.7	51.8	52.0	52.1	52.3	52.4	52.6	52.7	52.9	29
30	53.0	53.2	53.3	53.5	53.6	53.8	53.9	54.1	54.2	54.4	30
31	54.5	54.7	54.8	55.0	55.1	55.3	55.4	55.6	55.7	55.9	31
32	56.0	56.2	56.3	56.5	56.6	56.8	56.9	57.1	57.2	57.4	32
33	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6	58.7	58.9	33
34	59.0	59.2	59.3	59.5	59.6	59.8	59.9	60.1	60.2	60.4	34
35	60.5	60.7	60.8	61.0	61.1	61.3	61.4	61.6	61.7	61.9	35
36	62.0	62.2	62.3	62.5	62.6	62.8	62.9	63.1	63.2	63.4	36
37	63.5	63.7	63.8	64.0	64.1	64.3	64.4	64.6	64.7	64.9	37
38	65.0	65.2	65.3	65.5	65.6	65.8	65.9	66.1	66.2	66.4	38
39	66.5	66.7	66.8	67.0	67.1	67.3	67.4	67.6	67.7	67.9	39
40	68.0	68.2	68.3	68.5	68.6	68.8	68.9	69.1	69.2	69.4	40



10.3 > Bottom
 10.4 > above
 invert

Please Return to
 City of San Diego Water Dept.
 Room 268 Civic Center
 Telephone Main 5161

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 41.9. For same slopes but other widths of roadbed correct above figures by one-half difference in width of roadbed; thus in example above for 20 ft. roadbed distance will be $41.9 + (20 - 16) \div 2$ or 2 ft. added to 41.9 = 43.9. For slopes of 1 on 1 see inside of front cover.